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"mutually excluding each other, and taken together covering all possible phenom-"ena." We have our doubts whether the economists of nature, so called, deserve Mr. L. F. Ward's criticism. They were neither blind to the wastefulness of nature in comparison with human foresight nor did they ignore in their systems that social states are constituted by sentient and rational beings. What Mr. Ward does not seem to appreciate is that nature, even in the narrow sense in which he defines it, and mind do not exclude one another, and that natural laws govern even our mental acts, our desires and purposes together with the entire growth of social organisms. The members of a society are all conscious and rational beings ; they pursue their aim and make their plans, but they cannot with impunity replace the natural laws governing the social relations by artificial schemes. There is no such contrast between nature and mind as Mr. L. F. Ward seems to assume in his definition ; nor are the teleological aspirations of man in any sense a reversal of the natural processes but only a higher and more perfect stage of nature. We cannot artificially devise them but must invent them, for unless they agree with and are based upon the natural laws of the social growth, they will be unavailable.

Mr. L. F. Ward proposes to replace the old systems of society, "autocracy, aristocracy or democracy or even plutocracy," by sociocracy. Democracy is the last phase through which all must pass to reach sociocracy. By sociocracy the author understands a government purely in the interests of society. "All democratic governments are largely party governments"; sociocracy will do away with parties and attend to the business of the people in a business-like way. This, however, does not mean socialism, which Mr. L. F. Ward regards as being based "upon pure theory and *a priori* deductions." He says :

"It is the special characteristic of the form of government that I have called "sociocracy, resting, as it does, directly upon the science of sociology, to investigate "the facts bearing on every subject, not for the purpose of depriving any class of "citizens of the opportunity to benefit themselves, but purely and solely for the "purpose of ascertaining what is for the best interests of society at large."

Mr. L. F. Ward is an author whose literary and personal accomplishments have given him a well deserved prominence all over the States and especially at his home, Washington. His book treats a subject of great importance ; and although we cannot agree with many of its most fundamental tenets we recommend its study and cannot but say that it is full of valuable and suggestive thought. P. C.

THE INTRA-CRANIAL CIRCULATION AND ITS RELATION TO THE PHYSIOLOGY OF THE BRAIN. By *James Cappie*, M.D. Edinburgh : James Thin, 54 and 55 South Bridge. 1890. Pp. 188.

"My aim in the following pages," says the author, "has been to give a contri-"bution, on the one hand, to intra-cranial physics, and on the other to mental "physiology." His method might be called the philosophical method, which forestalls, but does not preclude experiment. "I shall not despair to show," he says, "that by the method I intend to pursue, more light may be thrown on the physiol-"ogy of the brain than can in the meantime be expected from any analysis of its "structures, however minute and accurate that may be. . . . The revelations of "minute anatomy are too frequently only isolated links. They furnish interesting "facts, rather than the explanation of wider phenomena. They show us instru-"ments, but not action. . . . No analysis of sea-water would ever explain the flow "and ebb of the tide; nor will the microscope or test-tube ever explain the flow "and ebb of consciousness. *Possibly, however, some measure of success may be gained "if we hold the brain, as it were, at arm's length, and take a bird's-eye view of its "more palpable relations.*"

With respect to subject, the author's contention is, that *the physiological bearing of the brain's surroundings* has not received in late years the attention it deserves. The cranium has hitherto been regarded simply as an organ of protection. "It is "more than likely, however, that, as I shall afterwards attempt to show, the prop-"erties of the skull exert a positive influence on the physiological action of the brain "itself. Then, what indeed appears not a little surprising, is the circumstance that "*the peculiarities of the encephalic circulation*—so numerous and so striking—now "receive less attention than they did in the early years of the century. It is with "some hope of reviving interest in these peculiarities, and to point out certain "modes in which they can exert an influence on the brain's activity, that I now "venture to submit the following essays."

Dr. Cappie prefaces his investigation with a few pages upon the philosophy of physical causation, which he considers simply in the physical point of view. In the main he takes the modern scientific view of cause, holding that in the investigation of physical phenomena we must not substitute a general term for facts. For example, the true scientist does not attempt to grapple with an entity *life* but with the conditions which go to constitute something *living*. An example analogous to this which bears upon the chief points of his investigation is that of "sleep." It is frequently stated by physiologists that sleep must be regarded as the cause rather than as the consequence of the so-called cerebral anæmia which obtains in the substance of the brain during repose. But to speak of sleep as a cause is substituting a general term for conditions of fact. Also, "no law, however universal, is the cause of any event." With respect to these points Dr. Cappie is very clear, and no philosophical psychologist will withhold his assent to this position. But if "life," "sleep," etc., cannot be causes, can "energy" be a cause? Dr. Cappie seems to think so, for he says, "energy itself is alone privileged to exercise actual power, and, therefore, sole efficient cause." The objection to this cannot be made too strenuous. Energy is an abstract physical concept, as life is an abstract biological concept. The realities it represents are masses in actual or possible motion, mathematically expressed. It, with matter, is no more the fundamental objective reality (despite Professor Tait's assertion) than is the theological notion of God. If this were seen, Dr. Cappie would not say that energy is mysterious, nor that motion is something apart from energy. The mystery is the hypostatisation of an abstract idea—viz., energy.

On the question of the correlation of mind and brain also Dr. Cappie is clear, holding, not that the two are identical, but simply that every form of mental activity must have its somatic side. It is, as we have seen, the special question of this book to give prominence to the circulation as one of the essential factors in conditioning the brain's activity. "The blood is to the grey matter of the brain what atmospheric air is to fuel in ordinary combustion." A consideration of the laws of this circulation, says the author, is of first importance in any attempt to take a comprehensive view of the brain's physiology. But on this subject there is a gap in physiological and psychological works. However, the circulation within the skull contrasts so remarkably with that of other parts of the body that the peculiarities presented cannot help possessing some definite physiological significance. Dr. Cappie then devotes a number of pages, adorned by three beautiful plates, to a lucid exposition of intra-cranial circulation, the results of which are that in the brain the quantity of blood is larger in proportion to the size of the organ nourished than in other parts of the body; that the larger arteries communicate with one another more freely here than in other parts; that the circulation of the brain mass is practically capillary; that the larger veins and arteries lie apart from one another; and that the venous blood is transmitted through channels with tough, inelastic walls.

After showing that the circulation of the brain is in part capillary, and that its rapidity varies with the requirements of nutrition, that the mass of blood within the cranium is practically uniform, and that the pressure of the atmosphere upon the contents of the cranium is an important factor, the author comes to the causation of sleep. This is the chief theme of the book. We shall state his hypothesis in his own words. He says: "We have not one or two, but a combination and succession of conditions inseparably linked together. The first change is a modified—a less energetic—movement in the molecules of the brain tissue; the last is compression of the whole organ. From lessened activity of the molecules spring a less active state of the capillary circulation and diminished stress through the cranial cavity. Next, we have a change in the balance of the encephalic circulation, in producing which the weight of the atmosphere, causing backward pressure in the cerebral veins, is an essential agent. The circulation in the brain itself is diminished; its vessels become comparatively empty, and to a corresponding extent the proportion of blood in the veins is increased. With the altered balance of the circulation there is a change in the balance of active pressure; it is less from within and more on the surface; it is less expansive and more compressing. With a certain amount of compression consciousness is suspended." For the full details we must refer the reader to the work itself.

In the eighth section of the book the author considers "how the peculiarities of the encephalic circulation may affect the mode or outcome of functional activity in the brain itself." The immediate seat of any activity must have its vascularity increased, and as a consequence some other portion of the brain must become less vascular. Secondly, a certain amount of pressure must be exerted on the surrounding tissues which will produce a more rapid movement of the blood current. Take attention. In the state of indifference the encephalic circulation will have a certain balance. If an impression is made on some sensory surface of sufficient strength to secure attention, the vascular activity of the part receiving the impression will be increased. So with attention. Its cerebral correlation is the focussing of the encephalic circulation in the direction of the activity, the increased activity of the circulation reacting on the energy of the tissue, thus making the mental effect produced stronger. "The momentum of the circulation is now directed towards "the centres of ideation and voluntary motion, and that implies derivation from "and consequent weakening of functional vigor in the sensory ganglia."

Similar applications are made to explain other familiar phenomena of mental physiology, including hypnotism. His principles, the author states, may also be applied to hysteria and other forms of insanity.

It is not within the province of *The Monist* to pass judgment upon special researches of this character. In the formulation of his problems, and in the clear emphasis of the points at issue, Dr. Cappie's method reminds us of Ribot. Also, with respect to the influence of anatomical characters on physiological and correlatively on psychical action, the idea of the author is related to the remarks of M. Binet, on a different subject, presented in Vol. III, No. 1, and Vol. IV, No. 1, of *The Monist*. But whatever their ultimate worth—which experience, if not experiment, will sometime determine—the reader of Dr. Cappie's work will find his conclusions clearly and undogmatically put, and will not regret the time spent upon its perusal.

THOMAS J. MCCORMACK.

SOCIAL EVOLUTION. By *Benjamin Kidd.* New York and London: Macmillan & Co. 1894. Pp. 348. Price, $2.50.

It is one of the chief results of Mr. Kidd's meditations that the evolution which is slowly proceeding in human society is not primarily intellectual but religious in character. "It would appear," he says, "that when man became a social creature "his progress ceased to be *primarily* in the direction of the development of his in"tellect. Thenceforward, in the conditions under which natural selection has ope"rated, his interests as an individual were no longer paramount; they became sub"ordinate to the distinct and widely different interests of the longer-lived social "organism to which he for the time being belonged. The intellect, of course, con"tinues to be a most important factor in enabling the system to which the individ"ual belongs to maintain its place in the rivalry of life; but it is no longer the "prime factor. . . . The race would, in fact, appear to be growing more and more "religious, the winning sections being those in which, *cæteris paribus*, this type of "character is most fully developed."

In speaking of the Utilitarian conception of ethics, which he rejects as incon-